

**On a separate piece of paper**, solve the following problems **showing ALL work**.

Calculate the mass in grams of each of the following:

- |   |   |
|---|---|
| 1) 5.0 moles of lead                          | 4) 4.0 moles of sodium                      |
| 2) 8.00 moles of iron                         | 5) 7.00 moles of elemental iodine ( $I_2$ ) |
| 3) 10.5 moles of elemental nitrogen ( $N_2$ ) | 6) 20 moles of lithium                      |

Calculate the number of moles in the following:

- |                      |                         |
|----------------------|-------------------------|
| 7) 800 g of barium   | 10) 66 g of magnesium   |
| 8) 280 g of neon     | 11) 93 g of phosphorous |
| 9) 560 g of chromium | 12) 72 g of carbon      |

Calculate the mass in grams of the following:

- |  |                               |
|--|-------------------------------|
| 13) 5.4 moles of $BaO$                           | 16) 200 moles of $Al_2O_3$    |
| 14) 12.0 moles of $PbSe$                         | 17) 40 moles of $K_2CO_3$     |
| 15) 9.50 moles of sugar ( $C_{12}H_{22}O_{11}$ ) | 18) 8.7 moles of $Mg(NO_3)_2$ |

Calculate the number of moles in each of the following:

- |                                 |                           |
|---------------------------------|---------------------------|
| 19) 400 grams of $KOH$          | 22) 119.78 g of $Au_2O_3$ |
| 20) 599 grams of $Fe_3(PO_4)_2$ | 23) 312 g of $Li_2O$      |
| 21) 5 grams of $CrS$            | 24) 0.38 grams $RaO$      |

The following problems deal with the amount of gas in a mole. However, specific conditions must apply to the gas substance for these answers to be correct. We will learn in the Gas Laws Unit that the volume of a gas will change with temperature and pressure. For these problems we will assume that the gasses are at standard temperature and pressure (STP). We will learn more about this later.

Note: There are 22.4 L of gas in one mole at STP.

How many moles of gas are in the following?

25) 37.3 L  $\text{H}_2$

27) 47.8 L  $\text{N}_2$

29) 130 L  $\text{CH}_4$

26) 400 L  $\text{C}_3\text{H}_8$

28) 98.9 L  $\text{Cl}_2$

How many liters of gas (@ STP) are in the following?

30) 254 mol Ar

32) 1 mol Ar

31) 2.95 mol  $\text{N}_2$

33) 0.02 mol  $\text{N}_2$

Calculate the following:

34) Mass of  $\text{CO}_2$  in 34 L

35) Volume in mL occupied by 10 g  $\text{CO}_2$

36) Mass in g of 100 mL of  $\text{SO}_3$